

REMARKS

Claims 75-91 are pending in this application. Claims 75, 88, and 89 have been amended. Claims 1-74 were previously cancelled as pursued in the parent case. Please consider the following remarks.

Claims 75-85 and 88-91 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,087,674 ("Ovshinsky et al.") in view of U.S. Patent No. 6,017,818 ("Lu") and U.S. Patent No. 5,877,087 ("Mosely et al."). This rejection is respectfully traversed.

Applicants renew the argument that, absent impermissible hindsight, there would be no motivation to combine the primary reference, Ovshinsky et al., with Lu and Mosely et al. so as to teach or suggest forming the contacts (6 and 8A) of Ovshinsky et al. by chemical vapor deposition (CVD). As previously discussed both in the prior Amendments and in the present Office Action, Ovshinsky et al. provides no disclosure as to what method is used to deposit a layer incorporating a first metal, aluminum, nitrogen, and boron so as to form structural layers 6 or 8A shown in FIG. 1 of the patent. Ovshinsky et al. explains that these layers (6 and 8A) are contacts adjoining a memory material such that the contacts can deliver an electrical signal to at least a portion of the memory material (col. 9, ll. 25-43). The nature and structure of layers 6 and 8A of Ovshinsky et al. would not lead one of ordinary skill in the art to search out special techniques for deposition to ensure conformability to an irregular surface or superior film characteristics, i.e., a CVD process would not be unnecessary. As shown by FIG. 1 of Ovshinsky et al., there are no contours in the structure shown and there need only be electrical contact between a portion of the memory material and the contacts 6 and 8A.

The layers 6 and 8A of Ovshinsky et al. are bulk contact layers, meaning that neither the conformability or superior quality results of the an expensive and time consuming CVD methodology would be attractive or necessary in their formation. Other methods, such as physical vapor deposition (e.g., sputtering or evaporation), would have been the deposition technique candidates for a person in the art wishing to form the structure disclosed in Ovshinsky et al., since no more would be necessary and this is the least expensive choice. The CVD-formed layers of the other references, i.e., layer 570 of Lu and layer 22 of Mosely et al., are required to be highly conformal layers because they are within high-aspect ratio vias. This is nothing like the blanket layers (6 and 8A) of the structure of Ovshinsky et al., which would not require similar techniques. There would be no motivation to combine these references, it is simply not technically needed and unnecessarily expensive.

The mere fact that references can be combined or modified is not sufficient to establish prima facie obviousness, the prior art must also suggest the desirability of the combination, which is not present here. M.P.E.P. § 2143.01 (citing In re Mills, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990) (emphasis added)). Without reliance on improper hindsight based on use of the present application as a road map, here the references' disclosures would not have been combined; the primary reference presents no reason to do so. M.P.E.P. § 2141.01(III). The discussion in the Office Action at page 6, while eloquent, is not correct because the "line of reasoning" does not hold up when viewed in light of the meager requirements of the Ovshinsky et al. structure and the real-life concerns of those of skill in the art. Absent hindsight using the present application, one reading the Ovshinsky et al. disclosure would not seek Lu or Mosely et al. for assistance. Because of the lack of motivation to combine Ovshinsky et al., Lu,

and Mosely et al., the subject matter of the claims would not have been obvious over these references, which individually do not teach or suggest such subject matter.

Accordingly, there is no prima facie obviousness established for the subject matter of the rejected claims.

Additionally, claim 75, as amended, defines a chemical vapor deposition method of depositing a layer over a semiconductor wafer and recites “placing said semiconductor wafer in a chemical vapor deposition chamber” and “heating said wafer” and “introducing a selected metal precursor, a selected aluminum precursor, a selected nitrogen precursor and a selected boron precursor into said chamber to substantially simultaneously deposit said first metal, aluminum, nitrogen and boron over said semiconductor wafer as a layer comprising $M_xAl_yN_zB_w$, wherein M is said first metal, x, y and z are each greater than zero, and w is between about 0.35 and about 1.4.” Such a method is not taught or suggested by Ovshinsky et al., Lu, and Mosely et al., even if the references were properly combinable under 35 U.S.C. § 103(a), which, as discussed above, they are not.

None of Ovshinsky et al., Lu, and Mosely et al. teaches or suggests “substantially simultaneously deposit[ing] said first metal, aluminum, nitrogen and boron over said semiconductor wafer as a layer comprising $M_xAl_yN_zB_w$, wherein M is said first metal, x, y and z are each greater than zero, and w is between about 0.35 and about 1.4” as recited by claim 75. First, none of the references, individually or combined, teaches or suggests the simultaneous deposition of the recited materials. Second, none of the references, individually or combined, teaches or suggests deposition of “a layer comprising $M_xAl_yN_zB_w$, wherein M is said first metal, x, y and z are each greater than zero, and w is between about 0.35 and about 1.4.” For each of

these reasons, the subject matter of independent claim 75 and dependent claims 76-87 is patentable over the references, combined or not.

Claim 88, as amended, defines a method of depositing an amorphous alloy comprising a first metal, aluminum, nitrogen and boron on an object and recites “placing said object within a chemical vapor deposition chamber” and “injecting gaseous precursors of said first metal, aluminum, nitrogen and boron into said chamber, wherein each of said gaseous precursors is transferred from a respective bubbler, each said respective bubbler and said chamber being at about a same pressure.” This method is not taught or suggested by Ovshinsky et al., Lu, and Mosely et al., individually or combined (again, combination of these references is improper).

None of Ovshinsky et al., Lu, and Mosely et al. (or Sandhu et al., discussed below in relation to claim 86) teaches or suggests a method including “injecting gaseous precursors of said first metal, aluminum, nitrogen and boron into said chamber, wherein each of said gaseous precursors is transferred from a respective bubbler, each said respective bubbler and said chamber being at about a same pressure” so as to form an amorphous alloy of metal, aluminum, nitrogen, and boron, as recited by claim 88. The only reference to even mention a bubbler (i.e., Sandhu et al.) is not cited in this rejection; however, even this reference does not indicate use of multiple bubblers for individual gaseous precursors as claimed. Additionally, none of the references cited in the Office Action discuss maintaining any pressure in a bubbler, much less a pressure like that in a CVD reactor. For these reasons, claim 88 is patentable over the cited references.

Claim 89, as amended, defines a method of depositing a generally conformal layer comprising a first metal, aluminum, nitrogen and boron on a semiconductor wafer and recites "providing a chemical vapor deposition reactor" and "placing said wafer within said reactor" and "heating said wafer to a selected processing temperature of from about 250 to about 550°C" and "establishing a pressure of 100 millitorr to 10 torr within said reactor" and "injecting a selected quantity of a gaseous organometallic precursor from a first bubbler into said reactor" and "injecting a selected quantity of an aluminum precursor from a second bubbler into said reactor, said first bubbler and said second bubbler being at a pressure substantially the same as that within said reactor" and "depositing said first metal, aluminum, nitrogen, and boron as a layer comprising $M_xAl_yN_zB_w$, wherein M is said first metal, x, y and z are each greater than zero, and w is between about 0.35 and about 1.4." Such a method is not taught or suggested by Ovshinsky et al., Lu, and Mosely et al., individually or combined (they cannot be combined).

As discussed above in relation to the patentability of independent claim 75, none of the references teaches or suggests "depositing said first metal, aluminum, nitrogen, and boron as a layer comprising $M_xAl_yN_zB_w$, wherein M is said first metal, x, y and z are each greater than zero, and w is between about 0.35 and about 1.4." Additionally, as discussed above in relation to the patentability of independent claim 88, none of the references (or Sandhu et al. for that matter), teaches or suggests "injecting a selected quantity of a gaseous organometallic precursor from a first bubbler into said reactor" and "injecting a selected quantity of an aluminum precursor from a second bubbler into said reactor, said first bubbler and said second bubbler being at a pressure substantially the same as that within said reactor." For each of these reasons,

independent claim 89 and dependent claims 90 and 91 are patentable over the cited references.

Since each of claims 75-85 and 88-91 is patentable over Ovshinsky et al., Lu, and Mosely et al., even if they could be properly combined, which they cannot, Applicants respectfully request that the 35 U.S.C. § 103(a) rejection of claims 75-85 and 88-91 be withdrawn.

Claim 86 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Ovshinsky et al. in view of Lu and Mosely et al. and further in view of U.S. Patent No. 5,246,881 ("Sandhu et al."). This rejection is respectfully traversed.

Claim 86 depends on claim 75, which has been discussed above as being patentable over Ovshinsky et al., Lu, and Mosely et al. Since Sandhu et al. does not provide motivation to combine the references and because individually, none of the references teaches or suggests the subject matter of claim 86 incorporated from independent claim 75, claim 86 is patentable over these references. Applicants respectfully request that the 35 U.S.C. § 103(a) rejection of claim 86 be withdrawn.

Claim 87 stands rejected under 35 U.S.C. § 103 as being unpatentable over Ovshinsky et al. in view of Lu and Mosely et al. and further in view of the Ward et al. publication. This rejection is respectfully traversed. As with claim 86, claim 87 depends from independent claim 75, which has been discussed above as being patentable over Ovshinsky et al., Lu, and Mosely et al. Since Ward et al. does not provide motivation to combine the references and because individually, none of the references teaches or suggests the subject matter of claim 87 incorporated from

independent claim 75, claim 87 is patentable over these references. Applicants respectfully request that the 35 U.S.C. § 103(a) rejection of claim 87 be withdrawn.

In view of the above amendment and remarks, applicant believes the pending application is in condition for allowance. A Notice of Allowance for all pending claims is respectfully requested.

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Respectfully submitted,

By 

Thomas J. D'Amico

Registration No.: 28,371

Ryan H. Flax

Registration No.: 48,141

DICKSTEIN SHAPIRO MORIN &
OSHINSKY LLP

2101 L Street NW

Washington, DC 20037-1526

(202) 785-9700

Attorney for Applicants